

WHAT IS CLAIMED IS:

1. A method of dyeing a paper web comprising applying a dye composition to a paper web, wherein the dye composition comprises
a binder;
a dye;
a thickener that is at least one of a polyvinylpyrrolidone homopolymer and a polyvinylpyrrolidone copolymer; and
water.
2. The method of claim 1, wherein the thickener is a polyvinylpyrrolidone homopolymer.
3. The method of claim 1, wherein the thickener is a poly(vinylpyrrolidone-vinyl acetate) copolymer.
4. The method of claim 1, wherein the dye composition further comprises at least one additional thickener formed of an acrylic acid/alkyl acrylate copolymer.
5. The method of claim 1, wherein the binder is selected from the group consisting of starches, acrylic ester/styrene copolymers, acrylic ester/acrylonitrile copolymers, carboxylated styrene/butadiene copolymers, and mixtures thereof.
6. The method of claim 1, wherein the dye composition further comprises a crosslinker
7. The method of claim 6, wherein the crosslinker is selected from the group consisting of blocked and straight or unblocked glyoxal-based insolubilizers, aliphatic epoxy resins, ammonium zirconium carbonate, potassium zirconium carbonate, melamine, melamine formaldehyde, blocked isocyanates, and mixtures thereof.
8. The method of claim 1, wherein the crosslinker is a blocked glyoxal-based insolubilizer.

9. The method of claim 1, wherein the dye is selected from the group consisting of basic dyes, acid dyes, anionic direct dyes, cationic direct dyes, anionic pigment dispersions, and cationic pigment dispersions.
10. The method of claim 1, wherein the dye composition further comprises a filler.
11. The method of claim 10, wherein the filler is selected from the group consisting of silica, silica gel, calcium carbonate, calcium sulfite, pyrophilite, kaolin, clay, titanium dioxide, aluminum hydroxide, aluminum trihydrate, satin white, barium sulfate, magnesium oxide, talc, colloidal silica, plastic pigments, and white urea resin pigments.
12. The method of claim 1, wherein the applying step comprises applying the dye composition to the paper web in a sizing press.
13. The method of claim 1, wherein the applying step comprises spraying the dye composition onto the paper or paper web.
14. The method of claim 1 further comprising a step of coating the paper web with a dye fixing agent and drying the paper web prior to the applying step.
15. The method of claim 14, wherein the dye fixing agent is selected from the group consisting of polyethyleneimines, polyethyleneimine derivatives, sodium chloride, magnesium chloride, potassium chloride, alum, diallyl dimethyl ammonium chloride and polymers thereof, optical brightening agents, silicas, and mixtures thereof
16. The method of claim 14, wherein the dye fixing agent is a polyethyleneimine or polyethyleneimine derivative solution.
17. The method of claim 1 further comprising a step of preparing the dye composition by mixing the binder, the dye, the thickener, and water.

18. The method of claim 1 further comprising drying the paper web after the applying step.
19. The method of claim 1, wherein the entire surface of the paper web is coated with the dye composition.